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(71) Applicant (for all designated States except US): **BAKER HUGHES INCORPORATED** [US/US]; P.O. Box 4740, Houston, Texas 77210-4740 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TABAROVSKY, Leonty A.** [US/US]; 12126 Via Porta Rosa, Cypress, Texas 77429 (US). **FORGANG, Stanislav W.** [US/US]; 18055 Somerset Knolls, Houston, Texas 77094-1429 (US).

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MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

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(54) Title: FORMATION RESISTIVITY MEASUREMENTS USING MULTIPLE CONTROLLED MODES

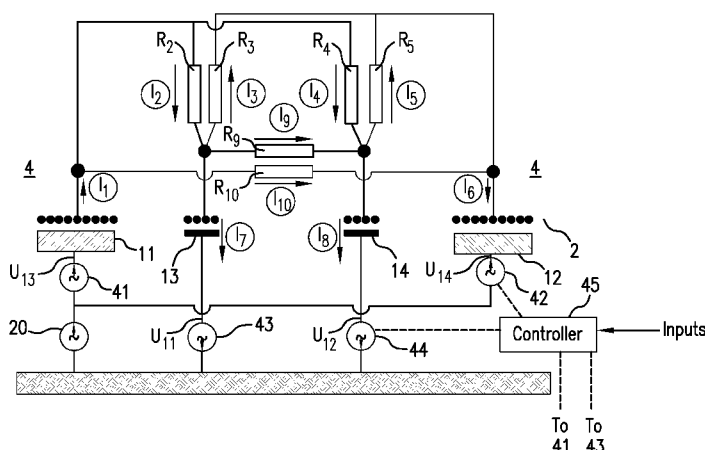


FIG.4

(57) Abstract: Disclosed is an apparatus for estimating a property of an earth formation penetrated by a borehole. The apparatus includes a plurality of electrodes disposed downhole and configured to inject an electrical current into the earth formation using an applied voltage and/or measure electrical current resulting from an injection of the electrical current. The apparatus also includes a processor configured to perform a series of formation measurements that include injecting current into the earth formation using a unique subset of electrodes in the plurality of electrodes and measuring current in the earth formation using one or more electrodes not used for the current injecting. The processor sums the measured currents for the electrodes wherein the sum of electrical currents for at least one electrode that measured electrical current is substantially in phase with the applied voltage; and uses the sum of in phase currents to estimate the property.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/031419**A. CLASSIFICATION OF SUBJECT MATTER*****G01V 3/20(2006.01)i, G01V 3/38(2006.01)i, E21B 47/00(2006.01)i, G06F 19/00(2011.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G01V 3/20; E21B 47/026; G01V 3/18

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: borehole, electrode, current, in phase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 7119544 B2 (ANDREW HAYMAN et al.) 10 October 2006 See column 1, line 46 - column 2, line 61; column 7, lines 18-28; claims 1-6 and figure 9.	1-19
A	US 2005-0067190 A1 (JACQUES R. TABANOU et al.) 31 March 2005 See paragraphs 41-55, 70, 71 and figures 1-3, 8.	1-19
A	US 4837518 A (MICHAEL F. GARD et al.) 06 June 1989 See column 3, lines 27-62; column 5, lines 49-68; claim 1 and figure 1.	1-19
A	US 2003-0122547 A1 (MANFRED G. PRAMMER) 03 July 2003 See paragraphs 5, 15, 32, 58; claim 5 and figure 3.	1-19

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search

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189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
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Authorized officer

YANG, Jeong Rok

Telephone No. 82-42-481-5709



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/031419

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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